NSW GOVERNMENT

NSW Resources Regulator

EXAMINER'S REPORT

Mining engineering manager of underground coal mines certificate of competence

August 2021

Written examinations

MB1 - Mining legislation

Summary of results and general comments

Exam date:	21 Oct 2020
Number of candidates:	15
Number who passed:	8
Highest mark:	85%
Average mark:	61%
Lowest mark:	37%

Examiner's comments

The exam was set around parts of the legislation that a Mining Engineering Manager (MEM) encounters regularly and therefore needs to know including notifiable incidents, high risk activities, dust and an Emergency Management Plan.

Question 1 (total of 20 marks)

Highest mark:	19
Average mark:	14.75
Lowest mark:	9.25

Question 2 (total of 20 marks)

Highest mark:	18
Average mark:	12.5
Lowest mark:	6

Question 3 (total of 20 marks)

Highest mark:	18
Average mark:	12
Lowest mark:	4

Question 4 (total of 20 marks)

Highest mark:	16
Average mark:	9.5
Lowest mark:	4

Question 5 (total of 20 marks)

Highest mark:	19
Average mark	12
Lowest mark:	1

MB2 - Mine ventilation

Summary of results and general comments

Exam date:	21 Oct 2020
Number of candidates:	13
Number who passed:	12
Highest mark:	83.5%
Average mark :	69%
Lowest mark:	37.75%

Question 1 (total 100 marks)

Highest mark: 88

Average mark: 73

Lowest mark: 27

Examiner's comments

- Some candidates did not include an upcast shaft in the 1st workings pillars on the bottom of the plan.
- Candidates that included a main fan at the top of a drift had very high velocities in both drifts.
- Most candidates showed realist face quantities and the location of monitoring points.
- The main fan efficiencies varied greatly.

Question 2 (total 100 marks)

Highest mark: 84.5

Average mark: 66

Lowest mark: 42

Examiner's comments

- Some suggested common issues:
  - liable to spontaneous combustion
  - mining under a known water body
  - gassy seams below
  - potential windblast
  - long distance from both Intakes and main fan.
- Gateroad development rates must equal or better Longwall (LW) retreat rates. e.g. If the LW retreats 1 x pillar per week, then the gateroad must complete a pillar a week.
  If the LW retreats a full block in a year, then the main headings must advance a full LW width per year.

- The future of the mine and increased production was in the new lease area which wasn't under the lake. This should have included a new upcast shaft and potentially either a new downcast shaft or intake drift.

MB3 - Coal mining practice

Summary of results and general comments

Exam date:	22 Oct 2020
Number of candidates:	15
Number who passed:	11
Highest mark:	74.5%
Average mark:	63%
Lowest mark:	47%

Section A - Underground coal mining

Candidates were to choose four of the six following questions.

Question 1 (total 20 marks)

Highest mark:	17
Average mark:	11.75
Lowest mark:	8
Question answered by:	15/15 candidates

Examiner's comments:

Some common suggested issues:

- entrapment
- withdrawal triggers/Trigger action response plans (TARPS)
- water against seals
- gassing out
- increase of O^2 in goaf

- inundations
- flooding of LW face
- water damage to strata support
- damage to monitoring
- loss of power
- surface to seam conduits
- loss of production
- short falls in pumping system.

Question 2 (total 20 marks)

Highest mark: 15

Average mark: 11.5

Lowest mark: 4

Question answered by: 10/15 candidates

Examiner's comments

This question was not answered well. While drift winders aren't common there needs to be an understanding of all winding systems.

Part c) possible recovery action:

- isolation of winder
- procedure for recovery reviewed
- experienced persons to recover
- damage to tracks
- damage to dolly car, including dump brakes
- damage to "services" in drift (pipes, cables and monitoring)
- slack rope removed prior to putting dolly car back on tracks
- training in use of "air bags" or other lifting gear and packing timber.

Question 3 (total 20 marks)

Highest mark: 17.5

Average mark: 12

Lowest mark: 5.5

Question answered by: 10/15

Examiner's comments

This question was designed to have candidates thinking about several issues at once.

Part a) possible immediate actions:

- withdrawal to surface – account for everyone
- Form Incident Management Team (IMT)
- geotech report. How deep, how wide and cause
- strata support recommendations
- organise contract company with Elevated Work Platforms (EWPs) to secure either side of fallen ground
- how much material breached the "bunded area"?
- work from both sides supporting with wire rope / chain mesh / bolts / shotcrete or similar
- clean up of fallen material with excavators and trucks - remember this is on the surface.
- inspect portals for damage
- inspect conveyor and services for damage and repair
- how was underground pumping and ventilation issues managed?

Question 4 (total 20 marks)

Highest mark: 14.5

Average mark: 11.9

Lowest mark: 9.5

Question answered by: 5/15

Examiner's comments

Possible suggested potential causes:

- LW recovery too slow
- goaf hanging up
- geological structure in area
- support bolts and mesh not suitable or not installed correctly
- take off face too wide
- shield set pressures / pump station fault
- width of LW face
- depth of cover.

Possible potential actions:

- install additional cable bolts and strata monitoring
- PUR
- short stow shields to speed up face recovery
- full review of strata in take-off area and bolt-up plan
- geotech report of next take-off area.

Question 5 (total 20 marks)

Highest mark: 15.5

Average mark: 13.45

Lowest mark: 11.5

Question answered by: 12/15

Examiner's comments

Possible potential causes:

- depth of cover
- geological structures
- change in strata
- strata support and design
- incorrect installation/encapsulation
- change in Cleat or change of direction
- coal burst
- width and/or height of roadways
- length of "cut outs"
- lack of information on ATM
- change management not completed.

Possible potential actions:

- increased pillar dimensions
- temporary rib support while bolting (shields)
- type / length and storage of chemicals
- type / length of support and design / density
- training and experience
- change direction

- audits and Planned Task Observations (PTO)s
- reduce roadway width
- reduce roadway height
- reduce "cut out" distance
- remote mining
- review ATM information and sign off of ATM.

Question 6 (total 20 marks)

Highest mark: 13.5

Average mark: 12

Lowest mark: 8

Question answered by: 8/15

Examiner's comments

Possible short-term actions:

- RA – SWOT (Strength / Weaknesses / Opportunities / Threats)
- Geotech / VO experts / VO / Tech Services Manager / Production Manager / Deputy / SSHR / Operators
- ventilation models
- complete 'change management'
- ventilation changes to suit
- flanking returns – seam is "gassy"
- roadheader to brush floor – Availability/gas monitoring and restrictions
- LHD with "cutter drum" to brush floor – Availability/gas monitoring and restrictions
- LHD to clean floor
- vent along old goaf edges/bleeder headings
- review and upgrade pumping system

- repair VCDs and leakage
- remove any obstructions – old bulk stonedust bags/belt structure/stowage
- install additional "double doors" for access
- get rid of floor material/side load onto conveyor/contamination or coal product
- supervision
- contractor management.

Possible long-term actions:

- consider a new UC shaft
- turn an intake into a return
- external vent audit / survey
- drive another return
- change pillar size
- move LW "Take – off" back from mains
- more balancing overcasts
- upgrade pumping system
- drive 'stow boards'.

Section B - Surface coal mining

Candidates were to choose one of the following questions.

Question 7 (total 20 marks)

Highest mark:	17.5
Average mark:	15.5
Lowest mark:	13
Question answered by:	7/15

Examiner's comments

This question was well answered.

Possible potential hazards:

- truck slides/loss of controls
- damage to highwall/wet strata/stability
- flooding of pit floor and equipment
- inrush
- environmental issues – contaminated or excessive water leaving site
- potholes/pooled water/soft spots in haul roads and dumps
- dragline cabling/power.

Possible actions:

- review the design of roads/drainage/cambers
- TARP to slow down or stop work
- wet weather – truck sliding training – experience of operators
- pumping system review
- drains to be built/cleaned above highwalls
- bunding cleaned out

- empty mine dams and check monitoring
- suitable 'wet weather' material on roads
- Drones to check highwalls for cracks
- review road grades
- OCE inspections and SOS addresses
- segregation of heavy and light vehicles
- control Room monitoring of wet weather/storm warning
- move equipment to higher ground
- flashing lights indicating damaged road surfaces/reduced speed limit areas
- lightning TARP.

Question 8 (total 20 marks)

Highest mark:	16
Average mark:	13.5
Lowest mark:	10
Question answered by:	8/15

Examiner's comments

This question was well answered.

Possible causes:

- fatigue - change in roster/time of year
- equipment failure - change in brand/change in maintenance
- road standards – change in material/grades/cambers
- speeding – abiding by road rules
- weather – was dry, now wet – water on roads
- watering of roads

- time of day – sun rise/sun set
- new starters/new contractors
- position/use of lighting plants
- overloaded utes
- tow loads and braking.

Possible actions:

- review maintenance schedule
- fatigue monitoring/gardvant/drug and alcohol testing
- review rosters
- review road standards/materials and inspections
- training and logbooks
- review brand of light vehicles
- OCE PTOs and SOS communication
- review road grades/bend radius/cambers/drainage
- grading procedure
- road watering procedure – dry lines
- rain/weather TARPs
- road rules – GPS tracking/proximity detection/speed limit for light vehicles
- weighbridge for ute and trailer loads
- clearly posted signage.

Post Oral examination

Date:	30 Sep 2020
Number of candidates:	6
Number deemed competent:	3

Oral examination

Date:	18 and 19 February 2021
Number of candidates:	8
Number deemed competent:	0

General comments

There will usually be a 'ventilation' question and/or an 'emergency' question in an oral exam.

This time both were tested in the same question. Understanding the 'ventilation' went a long way to answering the question.

Remember the priorities:

- first - people (all people)
- second - mine and machinery
- third – production.

More information

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Acknowledgments

Mining engineering manager of underground coal mines examination panel.

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